NERRS Science Collaborative Progress Report for the Period 09/01/12 through 02/28/13
Project Title: Expanding Living Shorelines within the ACE Basin NERR to Protect Habitat and to Reduce Climate Change Vulnerability through the Application of Collaborative Science-Based Habitat Restoration
Principal Investigator(s): John Leffler
Project start date: September 1, 2012
Report compiled by: John Leffler
Contributing team members and their role in the project:
Blaik Keppler – Collaboration Lead
Peter Kingsley-Smith – Applied Science Lead
Al Segars – field volunteer coordination
Susan Lovelace – facilitation advisor for intended user meetings
Michael Hodges – field logistics and volunteer coordination
Nancy Hadley – applied science consultant
Bruce Doneff – Project Advisory Committee
Clifford Campbell – Project Advisory Committee
Bud Skidmore – Project Advisory Committee
John Fisk – Project Advisory Committee
Queen Quet – Project Advisory Committee
Tony Mills – Project Advisory Committee
Amanda Flake – Project Advisory Committee
Denise Parsick – Project Advisory Committee
Taylor Sikes – Project Advisory Committee

A. Progress overview: State the overall goal of your project, and briefly summarize in one or two paragraphs, what you planned to accomplish during this period and your progress on tasks for this reporting period. This overview will be made public for all reports, including confidential submissions.

The overall goal for this project is to address three of the four ACE Basin NERR priority management issues, “Habitat Conservation”, “Water Quality”, and “Community Resilience”, by expanding living shorelines in the ACE Basin through a community-based, intended user-driven collaboration with SCDNR. Specifically, the project seeks to achieve the following goals:

- Create living shorelines that restore and conserve habitat by reducing erosion, improving water quality, and creating ever-growing breakwaters to protect shorelines in an era of climate change-driven sea level rise;
- Enhance communication and cooperation among local user groups;
- Establish habitat restoration lay advisors and monitors who will continue their activities beyond the scope and timeframe of this project; and
- Increase public commitment to stewardship.

During the first six months of this project we planned to work with intended users to identify specific locations within the ACE Basin for oyster reef construction and to prepare for spring constructions. All of our immediate objectives to date have been accomplished on schedule. The NERR-SCDNR project team contacted a variety of intended users involved with the ACE Basin area and who were leaders of different constituencies. 34 individuals representing NGOs, government agencies, recreational groups, and schools, as well as ten project staff participated in a six hour workshop on December 6, 2012. The roster for that meeting is presented in Table 1. The intended user participants established a set of criteria for selecting living shoreline oyster reef construction sites (erosion control, water quality

improvement, public access/visibility, and benefits to wildlife). They were then given detailed maps of the ACE Basin and by working first in teams and then as a whole, they identified specific locations that they felt met the criteria and deserved high priority. The workshop concluded with some of the participants volunteering to serve on the Project Advisory Committee that will provide advice and guidance throughout the project.

During January 2013 two teams of SCDNR biologists, accompanied each day by volunteers from the workshop, visited all of the workshop-identified sites. Based on a variety of parameters, each site was scored for its suitability for living shoreline construction. This included identifying which of four methods (loose oyster shell, bagged oyster shell, oyster castles, or concrete-coated crab traps) would be suitable for each location. Project staff met with the Project Advisory Committee on February 6, 2013 to report on the recommendations for each workshop-identified site. The Committee members then evaluated the merits of each location (Table 2) and prioritized those sites to be addressed during the first year of the project. Due to logistical and financial constraints, it will be possible only to install 2900 shoreline feet of loose shell, 550 feet of bagged shell, 550 feet of oyster castles, and 300 feet of crab traps during Year 1. The Committee members used these numbers to allocate the construction resources to the prioritized sites. Thirteen sites were selected for Year 1 activities (Table 3). Since the Project Advisory Committee meeting, the staff biologists and volunteer coordinators have been organizing the logistics of assembling materials and transportation, and working with the various intended user groups to organize volunteers who will assist with reef construction. All reefs will be constructed between April and June 2013.

B. Working with Intended Users:

- Describe the progress on tasks related to the integration of intended users into the project for this reporting period.
    - 34 intended users, representing a variety of organizations, participated in a workshop to establish site selection criteria and to identify specific sites for possible living shoreline construction. Volunteers from that group accompanied SCDNR biologists to inspect those sites and to assess their viability for oyster reef construction. A subgroup of intended users formed the Project Advisory Committee and met to prioritize the potential sites based on the workshop-established criteria. They then allocated all the first year's available construction resources among those sites. Intended users are now being organized to assist with the actually living shoreline construction efforts later this spring.

- What did you learn? Have there been any unanticipated challenges or opportunities?
    - We have been somewhat surprised by how well the work with the intended users has gone to date. They are extremely enthusiastic and invested in this work. Although some of the tasks they were asked to do were open-ended, they worked very effectively as a group to arrive at consensus that is moving the project forward.

- Who has been involved?
    - 34 intended users (Table 1) representing a wide range of organizations and ten project staff have been involved with the workshop, the site assessments, and the advisory committee meeting.

- Has interaction with intended users brought about any changes to your methods for integration of intended users, the intended users involved, or your project objectives?

- No. The plan for interaction with the intended users, and who is involved, has gone very well.

- How do you anticipate working with intended users in the next six months?
    - Between April and June, intended user volunteers from the organizations represented at the December workshop will be involved with project staff in the construction of the living shorelines at the priority sites selected by the advisory committee. This will require considerable organization of the construction materials, the transportation requirements, and the volunteers. In July a group of interested intended users will receive lay monitoring training by project staff, will assist staff with some monitoring, and will then begin providing quarterly reports on the reefs constructed during the spring.

C. Progress on project objectives for this reporting period:

- Describe progress on tasks related to project objectives for this reporting period.

The specific collaborative objectives are to
1. Conduct a facilitated process with intended users to prioritize restoration sites;
    - This was accomplished through the December workshop and through the February Project Advisory Committee meeting.

2. Establish a Project Advisory Committee (PAC) to organize and coordinate the volunteer efforts and to provide advice on all facets of the project;
    - This has been accomplished and the first formal meeting was held February 6, 2013.

3. Recruit and coordinate an extensive volunteer program necessary for the success of this program;
    - To date 34 intended users have been involved, each representative of different organizations. The spring reef construction period will determine how effective we are in turning out volunteers from these groups to assist with the reef construction projects.

4. Establish and train a team of lay monitors who will act as stewards of the restored sites and report observations to the SCDNR during and beyond the termination of this grant;
    - This objective will take place starting in July 2013.

5. Improve communication and coordination among all the groups involved with the project and develop a mechanism for continuing feedback to the SCDNR and the ACE Basin NERR staff regarding the management of the Reserve's resources.
    - This process has begun well and we hope to establish a continuing network of involved intended users through the success they experience with this project.

The applied science objectives for this project are to
1. Utilize state-of-the-art GIS techniques and on-the-ground site evaluations to provide information and expertise to the intended users' group on the distribution of habitat suitable for living shoreline restoration and enhancement;
    - SCDNR's Shellfish Section GIS specialist, Kristen Schulte, constructed a variety of maps that were used by the workshop and advisory committee participants in making their decisions. SCDNR staff, accompanied by volunteers, assessed all the sites for

characteristics such as wave energy, surface firmness, shoreline elevation, and linear feet in need of reef construction. Recommendations were developed regarding the most effective reef construction methodologies to apply at each location.

2. Evaluate sites identified and prioritized as being of critical concern to intended users and select appropriate best management practices (BMPs) for each site;

- Site evaluations by SCDNR staff and volunteers were constructed during January 2013. Best management practice reef construction methodologies were recommended at the Project Advisory Committee meeting in February.

3. Implement the most effective habitat restoration and enhancement techniques (outlined below) for the selected sites based on the expertise and previous experiences of the applied science team;

- This work will be accomplished during the April – June 2013 period.

4. Allocate specified acreage, linear extent, or numerical goals for each shoreline habitat restoration technique by working with intended users to coordinate volunteers in restoration efforts;

- At the Project Advisory Committee meeting in February the committee members allocated all of the available Year 1 resources to the sites that they prioritized. Volunteers are currently being recruited and organized for the actual construction efforts planned for later in the spring.

5. Coordinate post-construction reef monitoring with intended users (lay monitors) and provide feedback on the effectiveness of the habitat restoration efforts.

- Lay monitoring training will begin in July 2013 and reports will be made to the Project Advisory Committee in September and to another workshop of all participants in November.

- What data did you collect?
  - The following data were collected by the staff/volunteer evaluation teams for each of 26 sites identified at the workshop. Data were not collected from five other sites due to several factors indicated in Table 2.

  Site name
  Date assessed
  County
  Latitude
  Longitude
  Viable restoration strategies
  Creek width (m)
  Slope measurements (average of 3 measurements at each site)
  Distance from MLW to edge of marsh
  Distance from marsh to back edge of future restoration reef
  Sediment type (e.g., mud, mud/clay, shell, etc.)
  Sinkability (cm) Shell matrix depth (beneath sediment surface, cm)
  Nearby oyster abundance (1-5, where 1=no oysters nearby)
  Distance to nearest oysters (m)
  Potential length of available substrate (m)
  Potential width of available substrate (m)
  Potential area of available substrate (length x width, m2)

Creek form (straight vs. curved) shoreline site occurs on when looking downstream (left vs. right)
Nearby structures (check all that apply, e.g., docks, houses, boat landing, marina)
Distance to nearest access point
SCDNR Management Status (e.g., State Shellfish Ground, Undesignated, Culture Permit)
SCDHEC Status (e.g., Prohibited, Restricted)

- Has your progress in this period brought about any changes to your methods, the integration of intended users, the intended users involved or the project objectives?
  - No. The plan for interaction with the intended users, and who is involved, has gone very well.

- Have there been any unanticipated challenges, opportunities, or lessons learned?
  - No. The plan for interaction with the intended users, and who is involved, has gone very well. If anything, we might have been a bit surprised at how excited the intended users are and how efficient they have been in making decisions and arriving at consensus.

- What are your plans for meeting project objectives for the next six months?
  - Logistics and volunteer scheduling is currently underway for the April-June reef construction projects. There will be a meeting of the Project Advisory Committee in June or July, followed by a lay monitoring workshop. The next advisory committee meeting will be in September.

D. Benefit to NERRS and NOAA: List any project-related products, accomplishments, or discoveries that may be of interest to scientists or managers working on similar issues, your peers in the NERRS, or to NOAA. These may include, but are not limited to, workshops, trainings, or webinars; expert speakers; new publications; and new partnerships or key findings related to collaboration or applied science.
  - A description of this project, emphasizing the intended user-driven nature of the work, was presented at the joint meeting of the World Aquaculture Society and the National Shellfisheries Association in Nashville, TN on February 24, 2013. A presentation was made to the Beaufort (SC) Sportfishing and Diving Club on January 10, 2013. Other invited presentations to a Master Naturalist group and other environmental clubs are scheduled for March and April.

E. Describe any activities, products, accomplishments, or obstacles not addressed in other sections of this report that you feel are important for the Science Collaborative to know.
  - None

Table 1. Intended users and project staff who participated in the workshop that established site selection criteria, identified sites for reef construction. The participants represented a diverse group of organizations.

Expanding the ACE Basin's Living Shorelines
Thursday, December 6th, 2012; Nemours Plantation

Amanda Flake	Beaufort County	aflake@bcgov.net	843-255-2142
Bess Kellett	SC DNR - Boatany Bay Volunteer Coordinator	KellettC@dnr.sc.gov	843-869-2713
Bob Sandifer	FRESPACE	sandifeb@bellsouth.net	843-869-0056
Bruce Doneff	Friends of Hunting Island State Park	doneff@verizon.net	843-476-3022
Denise Parsick, Commissioner	Beaufort Soil & Water Conservation District	dparsick@embarqmail.com	843-522-8100
Dick Yetter	SC NRCS	dick.yetter@sc.usda.gov	803-360-0366
E.M./ "Bud" Skidmore	Edisto Island Preservation Alliance	emskidmore@aol.com	843-327-4007
E.V. Bell	SC Sea Grant Consortium	elizabeth.vernon@scseagrant.org	843-953-2078
Frank Gibson	Beaufort Sportfishing & Diving Club et al	fgibson@islc.net	843-522-2020
Frank Roberts	Lady's Island Oyster	ladyioyster@embarqmaill.com	843 473 5018
Fred Kinard	SC Wildlife Federation	fredkinard@hotmail.com	843-723-1135
Helga J Crandall	Beaufort High School CREATE Club	thcrandall@hargray.com	843-379-3081
Howard Schnabolk	NOAA Restoration Center	Howard.Schnabolk@noaa.gov	843-740-1328
James M. Brailsford, III	Chairman, Edisto Island Preservation Alliance	jmbrailsford@bellsouth.net	843-217-1580
James Rader	Ducks Unlimited	jrader@ducks.org	843.745.9110
James S. Rosen	Commander, Beaufort Sail and Power Squadron	jsrr02@aol.com	(843) 379-3771
Janie Lackman	Fripp Island Turtle Program	janie.lackman@gmail.com	8438384606
Jenks Mikell	EIOLT/Marine Advisory Committee	jmikell955@aol.com	803-260-7120
John R. Fisk	Low Country master Naturalists	sailingfisk@gmail.com	843-838-5541
Joy Brown	The Nature Conservancy	joy_brown@TNC.ORG	(843) 937-8807 x35
Laura M. Reasonover	Colleton County Middle School	lreasonover@colletonsd.org	843-782-0040 ext 22131
Mark Purcell	ACE Basin National Wildlife Refuge	mark_purcell@fws.gov	843-889-3084
Nicole Barnes	Colleton Preparatory Academy	nbarnes@colletonprep.org	843-538-8959
Patty Kennedy	Beaufort Open Land Trust	patty@openlandtrust.com	843-521-2175
Phil Young	Sea Island Fly Fishers	plyoung@embarqmail.com	
Queen Quet	Gullah/Geechee Sea Island Coalition	GullGeeCo@aol.com	843-838-1171
Rebekah Crandall	Beaufort High School CREATE Club	thcrandall@hargray.com	843-379-3081
Reed Armstrong	Coastal Conservation League	reeda@scccl.org	843-522-1800
Taylor Sikes	OV Associates/St. Jude Farms	syspray@gmail.com	843-869-1276 or 910-547-6229
Teri Metalak	St Helena Elementary - Beaufort County Schools	Teri.Metelak@beaufort.k12.sc.us	843-838-0300
Tony Mills	LowCountry Institute	tmills@lowcountryinstitute.org	843-987-2073
Tracy Sanders	USACE-Regulatory Division	Tracy.d.sanders@usace.army.mil	843-329-8190
Tripp Boltin	US Fish and Wildlife Service	walter_boltin@fws.gov	843-819-1229
Will Doar	SC DNR - Coastal Geologist	doarw@dnr.sc.gov	803-896-7989
Project Staff			
Al Segars, DVM	SC DNR, ACE Basin NERR	SegarsA@dnr.sc.gov	843-252-4244
Ben Stone	SC DNR	StoneB@dnr.sc.gov	843-953-9023
Blaik Keppler	SC DNR, ACE Basin NERR	kepplerb@dnr.sc.gov	843-953-9024
John Leffler, Ph.D.	SC DNR, ACE Basin NERR	lefflerj@dnr.sc.gov	843-953-3903
Kristen Schulte	SC DNR	SchulteK@dnr.sc.gov	843-953-5977
Mark Rasmussen	ACE Basin NERR, College of Charleston	RasmussenR@dnr.sc.gov	843-953-9041
Michael Hodges	SC DNR	HodgesM@dnr.sc.gov	843-953-9241
Nancy Hadley	SC DNR	HadleyN@dnr.sc.gov	843-953-9841
Peter Kingsley-Smith, Ph.D.	SC DNR	KingsleySmithP@dnr.sc.gov	843-953-9840
Susan Lovelace, Ph.D.	NOAA Hollings Marine Lab	susan.lovelace@noaa.gov	843-762-8933

Table 2. Summary and scoring sheet provided to the Project Advisory Committee to assist with their prioritization sites for Year 1, and for allocation of reef construction resources to the selected sites.

						SCORE (1 - 5)				
Location		Potential shoreline (ft)	Possible Strategies	Management Status	DHEC Status	Water Quality	Wildlife	Visible/ Access	Erosion	Total
1	**Factory Creek 1**	100 ft	Bags		Prohibited					
2	**Beaufort River 2A**	160 ft	Traps		Prohibited					
	Beaufort River 2B	90 ft	Bags		Prohibited					
3	**Beaufort River 3**	1150 ft	Bags / Loose / Traps / Castles		Prohibited					
4	**Beaufort River 4A**	270 ft	Bags / Castles	Culture permit	Prohibited					
	Beaufort River 4B	400 ft	Loose	Culture permit	Prohibited					
6	**Lucy Point Creek 6A**	50 ft	Traps		Open					
	Lucy Point Creek 6B	140 ft	Bags / Castles		Open					
	Lucy Point Creek 6C	130 ft	Bags / Castles		Open					
7	**Whale Branch Middle 7**	40 ft	Bags	Culture permit	Restricted					
8	**Hunting Island 8**	250 ft	Bags	State Shellfish	Open					
10	**Harbor River 10**	260 ft	Bags / Loose	State Shellfish	Open					
11	**Morgan River 11**	1120 ft	Loose							
12	**Coosaw Cut 12**	350 ft	Bags / Traps / Castles	State Shellfish	Open					
13	**Coosaw Cut 13**	1310 ft	Traps	State Shellfish	Open					
15	**Combahee River 15**	140 ft	Bags / Castles							
17	**Big Bay Creek 17**	300 ft	Bags / Traps	Culture permit	Open					
18	**Scott Creek 18**	170 ft	Bags / Traps / Castles		Prohibited					
19	**Scott Creek 19**	160 ft	Bags / Traps / Castles		Prohibited					
20	**St. Pierre 20**	160 ft	Traps		Restricted					
21	**Fenwick Cut 21**	490 ft	Bags / Castles		Open					
23	**Ocella Creek 23**	150 ft	Bags / Traps / Castles	Culture permit	Open					
24	**Steamboat Creek 24A**	520 ft	Traps	State Shellfish	Open					
	Steamboat Creek 24B	150 ft	Traps	State Shellfish	Open					
25	**Russell Creek 25A**	50 ft	Bags / Traps	State Shellfish	Open					
	Russell Creek 25B	70 ft	Bags / Traps	State Shellfish	Open					
5	**Jenkins Creek 5**	0				No Low Tide Access				
9	**Harbor River 9**	0				No Restoration - Abundant Oyster				
14	**Combahee River 14**	0				No Restoration - Abundant Oyster				
16	**Combahee River 16**	0				Not able to collect data - revisit year 2				
22	**South Edisto River 22**	0				No restoration - Very soft / difficult to				

Table 3. Planned restoration efforts for Year 1, resulting from Project Advisory Committee site prioritizations and allocations of restoration resources.

			Linear feet of shoreline to be restored			
Site No.	**Site Name**	**Stakeholder Interest**	**Bagged shell**	**Loose shell**	**Oyster castles**	**Crab traps**
7	Whale Branch Middle	6	40			
1	Factory Creek	5	100			
21	Fenwick Cut	5	90		210	
4A	Beaufort River	3	50		170	
4B	Beaufort River	2		400		
6C	Lucy Point Creek	1	70		60	
10	Harbor River	1	50	200		
11	Morgan River	1		1150		
17	Big Bay Creek	1	50			120
19	Scott Creek	1	50		50	60
23	Ocella Creek	1	50		60	50
25B	Russell Creek	1				70
3	Beaufort River	0		1150		
	TOTALS	**28**	**550**	**2900**	**550**	**300**

Figure 1. Intended users participating in the workshop to establish site selection criteria and identify specific locations for living shoreline construction.

Figure 2. SCDNR staff and intended user volunteers evaluating workshop-identified sites for living shoreline construction suitability.

Figure 3. Members of the Project Advisory Committee working to prioritize sites for Year 1 and allocate reef construction resources to each site. Poker chips of different colors were used to represent linear feet of shoreline that could be protected using one of four methods (loose shell, bagged shell, oyster castles, or crab traps). There were logistical limits to how many feet could be covered by each method in Year 1, and committee members had to decide how to distribute those resources among the sites found suitable for each method.

Figure 4. Map indicating the workshop-identified sites that were evaluated and the sites selected by the Project Advisory Committee for living shoreline oyster reef construction during Year 1.